

LISTING OF CLAIMS

- 1
2 1. (Currently Amended) A blending method comprising:
3 providing a set of examples that pertain to a shape or motion that is to be
4 animated, the examples being ~~provided relative to~~ placed within a multi-
5 dimensional abstract space, wherein each dimension of the abstract space is
6 defined by at least one of an adjective and an adverb;
7 selecting a point within the multi-dimensional abstract space that does not
8 coincide with a point that is associated with any of the examples, the selected
9 point corresponding to a shape or motion within the abstract space;
10 computing a single weight value for each of the examples; and
11 combining the single weight values for each of the examples in a manner
12 that defines an interpolated shape or motion that is a blended combination of each
13 of the examples of the set of examples.
14
- 15 2. (Original) The blending method of claim 1, wherein said
16 selecting is performed by an application.
17
- 18 3. (Original) The blending method of claim 1, wherein said
19 selecting is performed by a game application.
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- 21 4. (Original) The blending method of claim 1, wherein said
22 selecting is performed at run time.
23
- 24 5. (Original) The blending method of claim 1, wherein said
25 computing is performed at run time.

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2 6. (Original) The blending method of claim 1, wherein said
3 computing and combining are performed at run time.
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5 7. (Original) The blending method of claim 1, wherein said
6 computing comprises:

7 defining a cardinal basis for each example; and
8 evaluating the cardinal basis for each example relative to the selected point
9 to provide the weight value.
10

11 8. (Original) The blending method of claim 7, wherein the cardinal
12 basis comprises:

13 a radial basis function portion; and
14 another portion that is different from the radial basis function portion.
15

16 9. (Original) The blending method of claim 8, wherein said another
17 portion is not a radial basis function portion.
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19 10. (Original) The blending method of claim 8, wherein said another
20 portion is a linear portion.
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22 11. (Original) One or more computer-readable media having
23 computer-readable instructions thereon which, when executed by a computer,
24 implement the method of claim 1.
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12. (Original) A computerized blending system that is programmed with instructions which, when executed by the system, implement the method of claim 1.

13. (Currently Amended) A blending method comprising:
linearly approximating a degree of freedom that is associated with a new form or motion that is to be rendered based upon a plurality of examples that define respective forms or motions within ~~an~~ a multi-dimensional abstract space, wherein each dimension of the abstract space is defined by at least one of an adjective and an adverb;

defining a radial basis function for each of the examples;
combining the linear approximation and the radial basis functions to provide a cardinal basis function; and
using the cardinal basis function to render the new form or motion.

14. (Original) The blending method of claim 13, wherein:
said acts of linearly approximating and said defining are performed for each example; and

said combining comprises combining each of the respective linear approximations and their associated radial basis functions to provide multiple cardinal basis functions, one for each example; and

said using comprises combining the multiple cardinal basis functions to define a function that describes the new form or shape within the abstract space.

1 15. (Original) The blending method of claim 13, wherein said
2 defining comprises scaling the radial basis function for each example.
3

4 16. (Original) The blending method of claim 15, wherein said scaling
5 comprises evaluating a matrix system to ascertain a plurality of scaling weights,
6 individual weights of which are used to scale the radial basis functions.
7

8 17. (Original) The blending method of claim 16, wherein said matrix
9 system is configured so that its evaluation yields scaling weights which, when
10 used to scale a corresponding radial basis functions, result in a combination of the
11 radial basis functions and the linear approximation to provide the cardinal basis
12 function.
13

14 18. (Original) The blending method of claim 13, wherein the radial
15 basis functions are selected from a b-spline family of radial basis functions.
16

17 19. (Original) The blending method of claim 13, wherein said
18 linearly approximating comprises approximating the degree of freedom with a
19 least squares linear approximation.
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21 20. (Original) One or more computer-readable media having
22 computer-readable instructions thereon which, when executed by a computer,
23 implement the method of claim 13.
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1 21. (Original) A computerized blending system that is programmed
2 with instructions which, when executed by the system, implement the method of
3 claim 13.

4
5 22. (Currently Amended) One or more computer-readable media
6 having computer-readable instructions thereon which, when executed by a
7 computer, cause the computer to:

8 linearly approximate a degree of freedom that is associated with a new form
9 or motion that is to be rendered based upon a plurality of examples that define
10 respective forms or motions within ~~an~~ a multi-dimensional abstract space, by
11 deriving basis hyperplanes that fit a least squares hyperplane to a case where one
12 example has a value of 1 and the remaining examples have values of 0, wherein
13 each dimension of the abstract space is defined by at least one of an adjective and
14 an adverb;

15 account for residuals between the example values and the hyperplane by:

16 associating a radial basis function with each example;

17 ascertaining a radial basis weight value for each radial basis
18 function; and

19 scaling each radial basis function by its ascertained radial basis
20 weight value; and

21 sum the linear approximation and scaled radial basis functions to provide a
22 cardinal basis function.

23
24 23. (Original) The computer-readable media of claim 22, wherein the
25 instructions cause the computer to perform the recited acts of linear

1 approximation, accounting, and summing for each example to provide multiple
2 cardinal basis functions.

3
4 24. (Original) The computer-readable media of claim 23, wherein the
5 instructions further cause the computer to sum the multiple cardinal basis
6 functions to provide a function that describes the new form or motion within the
7 abstract space.

8
9 25. (Original) The computer-readable media of claim 24, wherein the
10 instructions cause the computer to select a point on the defined function and
11 render a new form or motion.

12
13 26. (Original) The computer-readable media of claim 22, wherein
14 each radial basis function has a width that is a function of the distance between its
15 associated example and the next nearest example in abstract space.

16
17 27. (Original) The computer-readable media of claim 22, wherein
18 each radial basis function is selected from the b-spline family of radial basis
19 functions.

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21 28. (Currently Amended) A computerized blending system
22 comprising:

23 at least one computer-readable media;

24 at least one processor;

1 instructions resident on the computer-readable media which, when executed
2 by the processor, cause the blending system to:

3 linearly approximate a degree of freedom that is associated with a
4 new form or motion that is to be rendered based upon a plurality of examples that
5 define respective forms or motions within an a multi-dimensional abstract space,
6 by deriving basis hyperplanes that fit a least squares hyperplane to a case where
7 one example has a value of 1 and the remaining examples have values of 0,
8 wherein each dimension of the abstract space is defined by at least one of an
9 adjective and an adverb;

10 account for residuals between the example values and the hyperplane by:

11 associating a radial basis function with each example;

12 ascertaining a radial basis weight value for each radial basis
13 function; and

14 scaling each radial basis function by its ascertained radial basis
15 weight value; and

16 sum the linear approximation and scaled radial basis functions to provide a
17 cardinal basis function.

18
19 29. (Original) The computerized blending system of claim 28,
20 wherein the instructions cause the blending system to perform the recited acts of
21 linear approximation, accounting, and summing for each example to provide
22 multiple cardinal basis functions.

23
24 30. (Original) The computerized blending system of claim 29,
25 wherein the instructions further cause the blending system to sum the cardinal

1 basis functions to provide a function that describes the new form or motion within
2 the abstract space.

3
4 31. (Original) The computerized blending system of claim 30,
5 wherein the instructions cause the blending system to select a point on the defined
6 function and render a new form or motion.

7
8 32. (Original) The computerized blending system of claim 28,
9 wherein each radial basis function has a width that is a function of the distance
10 between its associated example and the next nearest example in abstract space.

11
12 33. (Original) The computerized blending system of claim 28,
13 wherein each radial basis function is selected from the b-spline family of radial
14 basis functions.

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16 34. (Currently Amended) A blending method comprising:
17 defining a set of examples that pertain to a form or motion that is to be
18 animated, the examples being provided relative to a multi-dimensional abstract
19 space, wherein each dimension of the abstract space is defined by at least one of
20 an adjective and an adverb;
21 examining a plurality of forms or motions that are animated within the
22 abstract space from the defined set of examples;
23 identifying at least one form or motion that is undesirable;
24 selecting a form or motion from a location within the abstract space that is
25 proximate a location that corresponds to the undesirable form or motion; and

1 replacing the undesirable form or motion with the selected form or motion
2 to provide a pseudo-example that constitutes a linear sum of the examples of the
3 set of examples.

4
5 35. (Original) The blending method of claim 34 further comprising,
6 prior to said examining, providing the plurality of forms or motions by, for each
7 form or motion:

8 linearly approximating a degree of freedom that is associated with a new
9 form or motion that is to be rendered based upon the set of examples;

10 defining a radial basis function for each of the examples;

11 combining the linear approximation and the radial basis functions to
12 provide a cardinal basis function; and

13 using the cardinal basis function to render the new form or motion.

14
15 36. (Original) The blending method of claim 35, wherein:
16 said acts of linearly approximating and said defining are performed for each
17 example; and

18 said combining comprises combining each of the respective linear
19 approximations and their associated radial basis functions to provide multiple
20 cardinal basis functions, one for each example; and

21 said using comprises combining the multiple cardinal basis functions to
22 define a function that describes the new form or shape within the abstract space.

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24 37. (Original) The blending method of claim 36, wherein the radial
25 basis functions are selected from a b-spline family of radial basis functions.

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2 38. (Original) The blending method of claim 37 further comprising,
3 after said replacing producing a plurality of new forms or motions by repeating
4 said acts of linearly approximating a degree of freedom, defining a radial basis
5 function, combining and using, the pseudo-examples influencing the shape of the
6 cardinal basis functions.

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8 39. (Currently Amended) A blending method comprising:
9 defining at least two examples of a form in a multi-dimensional abstract
10 space, ~~the multi-dimensional abstract space~~ each dimension of the abstract space
11 being defined by at least one of an adjective and an adverb, a first of the example
12 forms being defined in a first position in the multi-dimensional abstract space and
13 a second of the example forms being defined in a second position in the multi-
14 dimensional abstract space that is different from the first position; and
15 computing a form in the first position such that when the computed form is
16 subjected to a transform blending operation that places the computed form in the
17 second position, it will match the second example form.

18
19 40. (Original) The blending method of claim 39, wherein the first
20 position is a rest position.

21
22 41. (Original) The blending method of claim 39, wherein the first
23 position is a rest position and the second position is angularly displaced from the
24 first position.
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1 42. (Original) The blending method of claim 39, wherein said
2 computing comprises computing a plurality of vertices associated with the form.
3

4 43. (Original) The blending method of claim 42 further comprising,
5 after computing the plurality of vertices, geometrically blending the computed
6 form in the first position with the first example form in the first position to provide
7 a geometrically blended form in the first position.
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9 44. (Original) The blending method of claim 43 further comprising
10 after said geometrically blending, transform blending the geometrically blended
11 form to provide the form that matches the second example form.
12

13 45. (Original) The blending method of claim 39, wherein the
14 example forms pertain to a skeleton-based figure.
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16 46. (Currently Amended) One of more computer-readable media
17 having computer-readable instructions thereon which, when executed by a
18 computer, cause the computer to:

19 define at least two examples of a form in a multi-dimensional abstract
20 space, ~~the multi-dimensional abstract space~~ each dimension of the abstract space
21 being defined by at least one of an adjective and an adverb, a first of the example
22 forms being defined in a first position in the multi-dimensional abstract space and
23 a second of the example forms being defined in a second position in the multi-
24 dimensional abstract space that is different from the first position; and
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1 compute a form in the first position such that when the computed form is
2 subjected to a transform blending operation that places the computed form in the
3 second position, it will match the second example form.

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